

3. Transportation of Foreign Research Reactor Spent Fuel to the United States

3.1 How is spent fuel from foreign research reactors transported to the United States?

With the exception of spent fuel from Canada, spent fuel from foreign research reactors is transported to the United States by sea in chartered commercial ships. Cargo other than foreign research reactor spent fuel is allowed on board only if the spent fuel is the last cargo on and the first cargo off. As a result, the ships' schedules can be controlled, and they can travel to their U.S. port of entry directly and with minimal delay. When a ship carrying foreign research reactor spent fuel approaches its U.S. port of entry, the Coast Guard maintains a security zone around the ship and escorts it to the dock.

Shipments of research reactor spent fuel from Canada will enter the United States by either truck or rail. The first shipment from Canada under the new program traveled by truck to the Savannah River Site in December 1996.

3.2 How much foreign research reactor spent fuel can each transport ship carry at a time?

Each transport ship can carry up to eight casks of spent fuel at a time. To reduce the total number of shipments, DOE consolidates spent fuel from several reactors into a single shipment whenever possible.

3.3 Before spent research reactor fuel leaves a foreign country, what precautions are taken to ensure that it is transported safely to the United States?

Before foreign research reactor spent fuel can be transported to the United States, DOE and the reactor operator must enter into a contract stipulating conditions for shipping the spent fuel. In the early stages of negotiations with a reactor operator, DOE sends a team to the research

reactor to visually inspect the fuel. The team also determines the facility's capabilities for preparing a shipment for transport. Technical experts from DOE and other appropriate U.S. departments and agencies, such as the Nuclear Regulatory Commission (NRC) and the Department of Transportation (DOT), review the inspection results.

Depending on the terms of the contract, DOE and/or the reactor operator select a cask for shipping the spent fuel. Before DOE allows any spent fuel to be loaded into a cask, the cask owner must demonstrate through detailed calculations that international requirements for safe shipment of spent fuel (such as radiation dose limits) can be met. These calculations are submitted to regulatory authorities in the United States and the country in which the reactor is located.

The reactor operator, personnel representing the cask owner, a representative from the International Atomic Energy Agency, and, in some cases, a DOE representative generally observe the loading of the spent fuel elements into casks. Before the spent fuel leaves the research reactor, regulatory authorities in the country of origin inspect the shipment. Before the spent fuel leaves the port for the United States, the reactor operator must submit a signed guarantee to DOE that the spent fuel in the cask has not been damaged by any loading or transport activities.

3.4 Are ships that transport foreign research reactor spent fuel subject to any special standards?

Several international conventions, codes, and regulations are applicable to ships that transport spent fuel from foreign research reactors:

- Code for the Safe Carriage of Irradiated Nuclear Fuel, Plutonium, and High-Level Radioactive Wastes in Flasks on Board Ships (INF Code, also known as INF2), adopted on November 4, 1993 (International Maritime Organization)
- International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, and the provisions of the International Maritime Dangerous Goods Code (International Maritime Organization)
- Safety Standards (INFCIRC/18), Regulations for the Safe Transport of Radioactive Materials (International Atomic Energy Agency)

Both the International Maritime Organization and the International Atomic Energy Agency are specialized United Nations agencies.